AD-A188 684 ECONOMETRIC COST FUNCTIONS FOR FAA COST ALLOCATION MODEL(U) FEDERAL AVIATION ADMINISTRATION WASHINGTON DC OFFICE OF AVIATION POLICY AND PL ANS D E TAYLOR ET AL. 1/1

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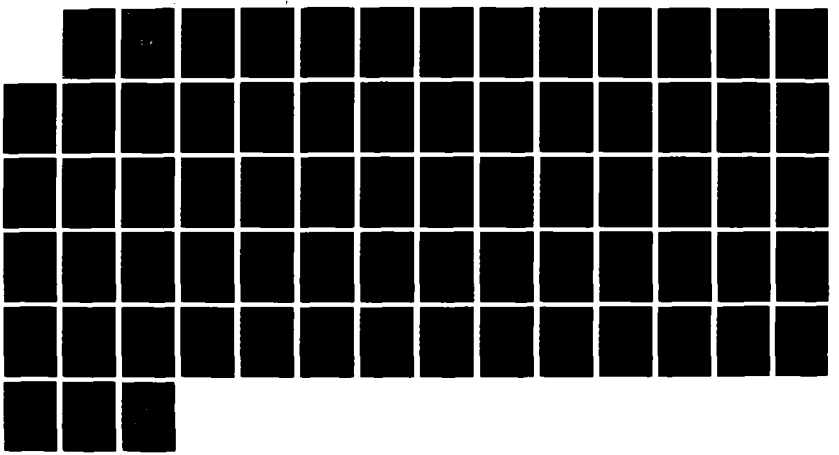

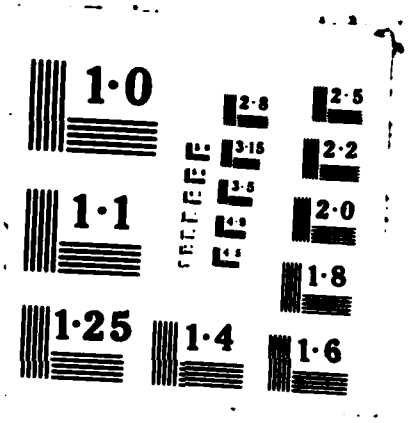
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U.S. Department
of Transportation

**Federal Aviation
Administration**

Office of Aviation Policy
and Plans

Washington, D.C. 20591

Econometric Cost Functions for FAA Cost Allocation Model

FAA-APO-87-15

December 1986

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FAA-APO-87-15	A188684	

4. Title and Subtitle	5. Report Date
Econometric Cost Functions for FAA Cost Allocation Model	December 1986
	6. Performing Organization Code: FAA (APO-220)
7. Author(s): Daniel E. Taylor, Frank J. Berardino, Jerome Bentley, and Earl Bomberger	8. Performing Organization Report No.
9. Performing Organization Name and Address: Office of Aviation Policy and Plans, Federal Aviation Administration, Department of Transportation, Washington, D.C. 20591	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.
12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered: Final Report
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This document was prepared under the supervision of the Office of Aviation Policy and Plans of the Federal Aviation Administration (FAA). It provides technical documentation for the FAA's report, "Airport and Airway Costs: Allocation and Recovery in the 1980s," (FAA-APO-87-7).

This volume provides detailed information on the estimation of econometric cost functions for certain FAA operating sites. These functions relate costs to measures of service provided such as operations handled and pilot briefs prepared. A separate cost function is estimated for each type of FAA site--Air Route Traffic Control Centers, Flight Service Stations, Terminal Radar Approach Controls, and VFR towers--for both 1984 and 1992.

17. Key Words	18. Distribution Statement
Public Finance; Airport and Airway System, Cost Allocation, Cost Recovery, Aviation User Taxes	Document is available to the public through the National Technical Information Service, Springfield, Virginia

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	71	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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SECTION 1.0

INTRODUCTION

This volume provides detailed information on the estimation of econometric cost functions for FAA operating sites--ARTCCs, FSSs, TRACONs and towers. For each type of operating site, two cost functions were estimated--one for 1984 and one for 1992. Results of these econometric analysis have been reported in Volumes 1 and 2, together with their use in the cost allocation process. This volume focuses exclusively on econometric issues.

There are a number of conceptual issues that need to be addressed before proceeding to the econometric results. These issues are related to the following topics:

- Resource and budget costs,
- Sunk costs,
- Joint and separable production functions,
- Direct costs,
- Indirect costs,
- Measures of activity,
- Joint cost functions.

These issues are addressed in the present section immediately below. Thereafter, the results for each type of operating site are reported in Section 2.0. Databases utilized to develop these estimates are included as an appendix in this volume.

1.1 Resource and Budget Costs

An appropriate measure of the avoidable resource cost is the value that society places on those goods and services not produced as the result of resources being diverted to the production of ATC services. The conceptually correct valuation of these costs requires the identification of society's willingness-to-pay for these foregone consumption opportunities.

If all resource markets are competitive, and the FAA is charged competitive market prices for all inputs to the production of ATC services, then resource and budget costs (i.e., the costs that appear in FAA budgets) will exactly coincide. These costs, however, may differ if resource markets are not competitive, or if the inputs purchased by the FAA are subsidized.

In the analyses that follow, it is assumed that resource markets are competitive in the long run--i.e., private sector providers of inputs to the FAA do not earn long run economic profits. This assumption is consistent with the main objective of this study--namely, to allocate the current and projected FAA budgets among user groups.

1.2 Sunk Costs

Sunk costs are those costs that are associated with the use of a resource that has already been purchased, and has no alternative use. For example, the cost associated with the purchase of equipment that has no alternative use outside the FSS system (i.e., the equipment cannot be resold on the market) are

sunk. Sunk costs are not avoidable either in the short run or the long run.

In the present study, existing FAA capital is assumed to be sunk. No return to this capital is imputed. In Appendix A of Volume 2, there is an extensive discussion of the reasons for this assumption. Here, it is appropriate to note that with a few notable exceptions, most ATC capital probably is truly sunk.

1.3 Joint and Separable Production Costs

The cost analysis of the ATC system is complicated by the fact that operating sites produce many services jointly and also provide these services to multiple types of users. A cost is separable if it can be traced directly to the provision of a specific service to a specific user group. Separable costs are avoidable; that is, separable costs vanish if the service to which they are attributed is no longer produced.

Joint costs are those costs that are incurred as the result of the production of more than one service. In general, joint costs will not disappear if an operating site is relieved of the responsibility of producing any given single service or of providing service to a user group. Joint or non-separable costs are avoidable only if no services are produced by the facilities.

1.4 Direct FAA Costs Exclusive of Capital Costs

Direct FAA costs exclusive of capital costs are likely to represent the largest component of avoidable costs at FAA operating sites. Consequently, considerable attention is focused on the analysis of these costs.

The principal components of direct ATC non-capital costs include the following:

- o Air traffic staffing costs,
- o Airway facilities staffing costs,
- o Leased communications costs.

The databases that were used in the analyses of both current and future (i.e., 1992) costs were constructed from these individual components of the FAA budget.

Air Traffic Staffing Costs--Air Traffic staffing costs represent the expenses for personnel directly responsible for the operation of ATC sites. These costs include the base salary of all personnel and a markup which accounts for other labor expenses. Specifically, the markup includes factors for fringe benefits, operational responsibility pay, premium pay, and overtime. Staffing levels for 1984 were provided by ATR 720. Future staffing levels were provided by the following:

- o ARTCC: based on staffing standards provided by ATR-720,
- o FSS: ATR-720,
- o Towers and TRACONs: AMS-560.

Current system labor rates were GS-Step 5 of the actual complement reported; in the future, these rates were increased by the assumed inflation rate.

Airway Facilities Staffing Costs--Airway Facilities staffing costs are the labor costs associated with the maintenance and upkeep of ATC facilities. The ATC system shares the Airways Facilities staff with other parts of the FAA; portions of the

expenses associated with the Airways Facilities staff are assigned to individual ATC facilities systems based on existing equipment at each site, and estimated annual labor hours (and therefore costs) of maintaining the equipment.

Staffing for 1984 was based on the Facilities Master File (FMF) database provided by APM-130. Hours were aggregated by major system for each site and then converted to employee-years. Labor costs (including supervision) were based on the average cost per AFS employee estimated from the maintenance portion of the 1984 budget.

The procedure for 1992 was a mirror image of the 1984 method except that labor hours were identified for the 1992 system from the forecast 1990 FMF.

Leased Communications Costs--Leased telecommunications costs are the expenses incurred by operating sites for leased communications equipment and services. These permit ATC personnel to communicate with both airmen and other facilities of the National Airspace System. Information on these costs was available from the FAAC's database only for 1984; estimates of future costs were unavailable, although the share of direct costs accounted for by this cost category is expected to decline.

1.5 Indirect ATC Costs

In addition to the direct costs associated with the operation and maintenance of operating facilities, there are also indirect costs associated with the ATC system. These indirect costs include administrative costs not assigned directly to any single facility. It is likely that some of these indirect

administrative costs would be reduced under the alternative privatization configurations. Estimates of these costs are reported in Volumes 1 and 2 and are not repeated here.

1.6 Measures of Activity

The FAA maintains records of traffic and service counts at all ATC facilities. These measures of output have been used in the econometric functions described below. More specifically, the measures are as follows:

- ARTCCs - handles
- FSSs - pilot briefs, IFR flight plans, VFR flight plans, and air contacts.[1]
- TRACONs - operations, seconds, and overs.
- Towers - operations.

Estimates of future services at each type of facility were derived from the following sources:

- ARTCCs - "Air Route Traffic Control Center Forecast--Fiscal Years 1985-1996" (April, 1985).
- FSSs - "Total Flight Services, Pilot Briefs, Aircraft Contacted and Flight Plans Originated--Flight Service Stations--Fiscal Years 1985-1992" (October, 1985).
- TRACONs and towers - "FAA Terminal Area Forecast" (1984).

It should be noted that the tower and TRACON output measures were derived from the terminal area forecast because "FAA Aviation Forecasts" does not provide a breakdown of relative growth rates at TRACONs and towers.

TRACON and tower data were modified using OAG data to identify commuter and international operations. The procedure is described in Appendix A.

1.7 Joint Cost Functions

A joint cost function expresses a relationship between costs and some measure of joint output or productivity. For example, let C_i and Q_i represent, respectively, total direct costs and a measure of joint output for the ith facility. The cost function can then be written:

$$C_i = f(Q_i)$$

If the cost function is known, the marginal cost of the jth service at the ith facility, $MC(Q_{ij})$ can be computed as:

$$MC(Q_{ij}) = \partial C_i / \partial Q_{ij}$$

where Q_{ij} is the output of the jth service at the ith facility.[2]

Given $MC(Q_{ij})$, the avoidable costs of producing the jth service at the ith facility, $V(Q_{ij})$, can be computed as:

$$V(Q_{ij}) = \int_0^{Q_{ij}} MC(Q_{ij})dQ_{ij}$$

The avoidable costs of producing the jth service for the entire system can be computed by summing $V(Q_{ij})$ over all facilities.

With these preliminary matters completed, the results are reported in Section 2.0.

SECTION 2.0

RESULTS

This section reports the results of the econometric cost functions estimated for FAA operating sites--ARTCCs, FSSs, TRACONs, and towers--for the years 1984 and 1992.

The results for 1984 are reported in 1984 dollars. The 1992 cost functions were estimated in 1986 dollars. A comparison of the results for the two years is shown in Table 2.1, which presents the results of both cost functions in terms of 1986 dollars. A full discussion of the implications of these results can be found in Section 2.0 of Volume 2. Here it need only be noted that future system costs are forecast to decline substantially. This is due to the improvements in productivity attributable to new capital equipment being installed under the National Airspace System Plan.[3]

In reaching these conclusions, several tests of the properties of the cost functions were conducted. Common for all types of facilities were tests for:

- Non-linearity,
- Differences in the cost of producing output for different user groups,
- Multicollinearity.

Each of these is briefly described below.

Table 2.1

COMPARISON OF 1984 AND 1992 OPERATING SITE COSTS

(1986 Dollars)

Marginal Costs	ARTCCs (Handles) 1984	ARTCCs (Handles) 1992	FSSs (Services) 1984	FSSs (Services) 1992	TRACONs (TSOs)* 1984	TRACONs (TSOs)* 1992	Towers (Operations) 1984	Towers (Operations) 1992
- Air Carrier	$14.42	$10.86	$6.69	$4.27	$13.25	$12.55	$8.19	$8.48
- Commuters	$14.42	$10.86	$6.69	$4.27	$13.25	$12.55	$1.93	$1.75
- General Aviation	$13.07	$10.86	$6.69	$4.27	$3.56	$4.72	$1.49	$1.16
- Military	$22.05	$17.29	$6.69	$4.27	$13.25	$12.55	$4.61	$3.05
Joint Costs Per Site	$4,225,062	$5,865,511	$93,066	$477,317	$880,073	$1,308,647	$400,155**	$519,151**
R-Squared	.896	.872	.929	.897	.867	.804	.555	.763

* TSO's equal operations, seconds and overs at TRACON's.

** Level 1 Tower joint costs are $85,133 lower in 1984 and $252,713 lower in 1992.

2.1 Non-Linearity

One of the key steps in estimating any economic function is testing for alternative functional forms. Under many circumstances, economic theory specifies those forms which are consistent with market expectations. For the present case, there are no theoretic reasons for expecting a particular functional form. As it turns out, linear functions were found for all four types of operating sites. However, log linear and quadratic forms were tested. In all cases, these forms were less satisfying than the linear forms. Furthermore, visual inspections of data indicated that relationships between cost and output in the production of FAA ATC services were linear.

2.2 Group Costs

For each operating site, several alternative specifications of the output terms were tested. The objective was to determine whether or not there were identifiable differences in the costs of producing services for different user groups. Standard analysis of variance techniques were applied to the coefficients for each cost function tested. The results are discussed for each operating site immediately below.

2.3 Multicollinearity

Many approaches have been employed in the statistical literature to detect multicollinearity. When multicollinearity is present, it is difficult to disentangle the unique effects of each predictor on the responsible variable. As a result,

regression coefficients become unstable and their values may be subject to dramatic changes due to additions or deletions of variables, or small changes in datasets. One would expect that multicollinearity could be a problem for cross-sectional cost functions such as those estimated for this study. For example, FSSs which produce large numbers of pilot briefs, also are likely to take a large number of flight plans; the opposite would be true at smaller facilities.

In order to detect the seriousness of such problems, the following factors were evaluated:

- o High correlation between two or more explanatory variables.
- o High R-squared value with low partial correlation coefficients.
- o A high condition index with high variance-decomposition proportions for two or more estimated regression coefficient variances.[4]

The results for the test conducted for each type of ATC site are reported in the sections immediately below. The discussion now turns to the results of the regression experiments.

2.4 ARTCCs

A comparison of the average values of variables included in the cost functions are shown in Table 2.2.

Table 2.2

MEAN VALUES OF ARTCC VARIABLES

22 Observations

Mean Values	1984	1992
Total Cost	$22,722,500 (1984 - $)	$36,825,200 (1986 - $)
Air Carrier Handles	682,507	884,248
Commuter Handles	115,816	201,916
GA Handles	416,190	568,957
Military Handles	220,354	218,364

It is interesting that the average number of military handles at an ARTCC is forecast to decline in the period 1984 to 1992. In contrast, there are sharp increases in commuter handles, and somewhat smaller increases forecast for air carrier and general aviation handles. The table also indicates that air carriers account for nearly 50 percent of the activity at ARTCCs.

The results of the regression experiments for 1984 and 1992 are shown in Tables 2.3 and 2.4. In general, both estimated cost functions appear to be sound statistically. The individual coefficients have the expected signs, and are highly significant. In addition, both models explain almost 90 percent of the variation in costs.

Table 2.5 reports the results of the tests of the properties of the ARTCC cost functions. Evaluations of both the log linear and quadratic forms resulted in increased collinearity in the

Table 2.3

1984 ARTCC

Econometric Results

User Group	($-1984) Estimated MC	t-Statistics
Air Carrier	$ 13.93	3.83
Commuter	$ 13.93	3.83
GA	$ 12.63	4.31
Military	$ 21.30	4.55

Joint Cost per Site = $ 4,082,285

R-Square = 0.896

Activity Measure: Handles

Cost Measure: AFS and ATC Labor and Leased Telecommunications

Table 2.4

1992 ARTCC

Econometric Results

User Group	($-1986) Estimated MC	t-Statistics
Air Carrier	$ 10.86	10.47
Commuter	$ 10.86	10.47
GA	$ 10.86	10.47
Military	$ 17.29	4.12

Joint Cost per Site = $ 5,865,511

R-Square = 0.872

Activity Measure: Handles

Cost Measure: AFS and ATC Labor

dataset. Visual inspection of the data indicated that a linear relationship existed between ARTCC costs and output.

Table 2.5

TESTS OF PROPERTIES OF ARTCC COST FUNCTIONS

Test	Result
Non-Linearity	Negative--Collinearity; visual inspection showed linear relationship
User Group Costs	Three separate groups identified: AC/COM, GA & MIL in 1984. Two groups identified in 1992: military, all others
Collinearity	Negative--no indications under alternative tests

Analysis of variance tests indicated that three separate cost groups could be identified for the 1984 regression. Air carriers and commuters exhibited similar cost properties at ARTCCs. These were distinct from general aviation and military users, with the former exhibiting lower costs than air carriers and commuters, and the military exhibiting significantly higher costs. In the 1992 results, only two separate groups were identified: the military, and all other user groups. Again, the military marginal costs were higher than those of other user groups. This result probably reflects the increased costs imposed on ARTCCs by military users operating in Special Use Airspace. Not only must controllers pay strict attention to the military operators, but civilian operators must be guided around these geographic areas during military exercises.

Finally, none of the alternative tests for multicollinearity indicated any problem for either of the ARTCC cost functions.

2.5 FSSs

Table 2.6 reports the mean values of the variables used in the FSS cost equations.

Table 2.6

MEAN VALUES OF FSS VARIABLES

306 Observations in 1984; 59 Observations in 1992

Mean Values	1984	1992
Total Cost	$769,899 (1984 - $)	$3,197,325 (1986 - $)
Pilot Briefs	50,043	315,762
IFR Flight Plans	21,167	139,360
VFR Flight Plans	6,312	37,403
Air Contacts	27,919	144,757

What is immediately obvious from the table is the vast differences between the average facilities in 1984 and 1992. Both cost and output measures are substantially larger for the 1992 advanced FSS system, than for the current system. This is wholly due to the expected reduction in the number of FSS stations from 306 in 1984 sample to 59 in 1992 sample. It should also be noted that the results for different user groups are not reported in Table 2.6. This is due to the finding that there were no differences found in the cost of producing FSS services for different user groups.

The results of the regression experiments for FSSs in 1984 and 1992 are reported in Tables 2.7 and 2.8 respectively. In general, both estimated cost functions appear to be statistically sound, with individual coefficients having expected signs and high significance. Both models explain approximately 90 percent of the variation in FSS costs.

Shown in Table 2.9 are the results of the tests of properties of the FSS cost functions. Tests for non-linearity proved to be negative, with both the log linear and quadratic forms having less desirable properties than the linear form.

Table 2.9

TESTS OF PROPERTIES OF FSS COST FUNCTIONS

Test	Result
Non-Linearity	Negative--Collinearity; visual inspection showed linear relationship
User Group Costs	No difference--separate user group specifications showed similar marginal costs
Cost of Services	Positive in current system, no difference in future
Collinearity	Positive in 1984--IFR flight plans and pilot briefs: specified together; air contacts and VFR flight plans: alternatives inconsistent with time and motion study

Analysis of variance tests indicated that there were no differences in the cost of producing FSS services for different user groups. However, some differences were found in the cost of

Table 2.7

1984 FSS

Econometric Results

Type of Service	($-1984) Estimated MC	t-Statistics
Pilot Briefs	$ 6.86	44.96
IFR Flight Plans	$ 6.86	44.96
VFR Flight Plans	$ 13.68	6.82
Air Contacts	$ 3.87	4.62

Joint Cost per Site = $ 89,919

R-Square = 0.929

Activity Measures: Pilot Briefs, IFR Flight Plans, VFR Flight Plans, Air Contacts

Cost Measure: AFS and ATC Labor and Leased Telecommunications

Table 2.8

1992 FSS-ALL SERVICES

Econometric Results

User Group	($-1986) Estimated MC	t-Statistics
Pilot Briefs	$ 4.27	3.67
IFR Flight Plans	$ 4.27	3.67
VFR Flight Plans	$ 4.27	3.67
Air Contacts	$ 4.27	3.67

Joint Cost per Site = $ 477,317

R-Square = 0.897

Activity Measure: Pilot Briets + VFR and IFR Flight Plans + Air Contacts

Cost Measure: AFS and ATC Labor

producing individual services in 1984. Here, distinct costs can be identified for air contacts, pilot briefs and IFR flight plans together, and VFR flight plans. No differences in the cost of producing services were found for the 1992 cost function.

Finally, multicollinearity was detected in the 1984 regression experiments. Specifically, IFR flight plans and pilot briefs were found to be collinear; to remedy the problem, these variables were added together, and specified as a single variable in the regression experiment. In addition, some collinearity existed between air contacts and VFR flight plans. Several alternative specifications of the cost function were estimated to attempt to reconcile this problem. However, the alternatives were inconsistent with a time-and-motion study for the production of FSS services.[5] Specifically, VFR flight plans command approximately 2.5 times more of a FSS specialist's time than an air contact. For this reason, specifications shown in Table 2.7 was deemed to be more reliable than the alternatives evaluated.

2.6 TRACONs

Shown in Table 2.10 are the mean values of the variables used in the TRACON regressions for 1984 and 1992. The output measures reported in this table are termed TSOs which include operations, seconds and overs at towers equipped with radar facilities. Several things are of note in the table. First, total TSOs are dominated by general aviation users. Second, military activity at TRACONs are forecast to remain constant in

the period 1984 through 1992. Third, general aviation users are forecast to increase their activity at TSOs faster than other groups in that same time period.

Table 2.10

MEAN VALUES OF TRACON VARIABLES

185 Observations

Mean Values	1984	1992
Total Cost	$2,745,123 (1984 - $)	$3,696,970 (1986 - $)
Air Carrier TSOs	60,432	66,237
Community TSOs	31,967	35,950
GA TSOs	126,951	178,314
Military TSOs	21,494	20,805

The results of the regressions for 1984 and 1992 are shown in Tables 2.11 and 2.12 respectively. Both estimated cost functions appear to be sound statistically. The individual coefficients have the expected sign and are highly significant. The 1984 model explains over 85 percent of the variation in cost while the 1992 model explains over 80 percent.

Shown in Table 2.13 are the results of tests of the properties of the TRACON cost functions.

Table 2.11

1984 TRACON

Econometric Results

User Group	($-1984) Estimated MC	t-Statistics
Air Carriers	$ 12.80	28.38
Commuters	$ 12.80	28.38
GA	$ 3.44	4.18
Military	$ 12.80	28.38

Joint Cost per Site = $ 850,312

R-Square = 0.867

Activity Measures: Operations + Seconds + Overs

Cost Measures: AFS and ATC Labor and Leased Telecommunications

Table 2.12

1992 TRACON

Econometric Results

User Group	($-1986) Estimated MC	t-Statistics
Air Carriers	$ 12.55	23.83
Commuters	$ 12.55	23.83
GA	$ 4.72	5.14
Military	$ 12.55	23.83

Joint Cost per Site = $ 1,308,847

R-Square = 0.804

Activity Measure: Operations + Seconds + Overs

Cost Measure: AFS and ATC Labor

Table 2.13

TESTS OF PROPERTIES OF TRACON COST FUNCTIONS

Test	Result
Non-Linearity	Negative--Collinearity; Visual inspection showed linear relationship
Cost of Services	No difference in producing operations, second and overs
User Group Costs	GA costs different--separate specifications showed all other user groups the same
Collinearity	Negative--no indications under alternative tests

Tests for non-linearity proved to be negative due to increases in collinearity in the dataset. Analysis of variance tests were run to determine whether there were differences in the costs of producing operations, seconds and overs at TRACONs. The results indicated that the costs closely corresponded to one another which resulted in a specification of the cost function with an activity variable that included all three types of services provided at TRACONs.

The analysis of variance tests for the cost of producing services for different user groups indicated that there were two distinct groups of users in both 1984 and 1992: general aviation users, and all other users. The general aviation users exhibited substantially lower costs per TSO than did other groups. It is surmised that this result reflects the lower weight assigned to general aviation operations in both FAA Staffing Standards and FAA Establishment Criteria.

Finally, none of the tests for multicollinearity indicated any problem with either of the TRACON cost functions.

2.7 Towers

Table 2.14 summarizes the mean values of the variables used in the 1984 and 1992 tower regression experiments. The most

Table 2.14

MEAN VALUES OF TOWER VARIABLES

203 Observations

Mean Values	1984	1992
Total Cost	$551,260 (1984 - $)	$626,926 (1986 - $)
Air Carrier Operations	1,281	1,772
Commuter Operations	5,733	8,605
GA Operations	110,869	154,439
Military Operations	4,106	4,442
Percent Level One Facilities	43%	43%

striking feature of this table is the dominance of general aviation operators at FAA towers without radar. This dominance is expected to continue in 1992. As part of the regression analysis, two types of towers were identified: level one and all other towers. Approximately 43 percent of the towers in both 1984 and 1992 were identified as level one facilities.

The results of the regression experiments for 1984 and 1992 are shown in Tables 2.15 and 2.16 respectively. Both cost functions appear to be sound statistically. The coefficients for commuter operators exhibit higher standard errors than for other types of operators, but analysis of variance test indicate significance. These results are also somewhat less robust than other types of operating sites. In part this is due to the fact that the joint costs at each site are a high proportion of the total costs.

Shown in Table 2.17 are the results of tests of the properties of the tower cost functions.

Table 2.17

TESTS OF PROPERTIES OF TOWER COST FUNCTIONS

Test	Result
Non-Linearity	Negative--Collinearity; visual inspection showed linear relationship
User Group Costs	Four separate groups--AC, COM, GA, MIL
Collinearity	Negative--no indications under alternative tests

Alternative functional forms were tested (including the log linear and quadratic forms) but the results indicated that the linear cost function had superior results. Four separate user groups were identified in both 1984 and 1992: air carriers, general aviation, commuters and the military. Neither of the equations reported showed any indications of multicollinearity.

Table 2.15

1984 TOWER

Econometric Results

User Group	($-1984) Estimated MC	t-Statistics
Air Carriers	$ 7.91	2.53
Commuters	$ 1.86	1.76
GA	$ 1.44	9.60
Military	$ 4.45	3.83
Level 1 Dummy Variable	- $ 85,133	3.49

Joint Cost per Site = $ 386,623

R-Square = 0.555

Activity Measure: Operations

Cost Measure: AFS and ATC Labor and Leased Telecommunications

Table 2.16

1992 TOWER

Econometric Results

User Group	($-1986) Estimated MC	t-Statistics
Air Carriers	$ 8.48	4.19
Commuters	$ 1.75	2.86
GA	$ 1.16	10.04
Military	$ 3.05	3.08
Level 1	-$252,713	11.16

Joint Cost per Site = $ 519,151

R-Square = 0.763

Activity Measure: Operations

Cost Measure: AFS and ATC Labor

Finally, level one facilities exhibited substantially lower costs than did other FAA towers. In 1984, the average level one facility exhibited costs $85,000 lower than other towers, while in 1992, the reduction in costs is expected to be $253,000. The coefficient on the dummy variable for level one facilities is subtracted from the constant term in the equation to reconcile these cost differences.

2.8 Conclusions

Perhaps the most important conclusion to be drawn is that robust econometric results can be developed to explain the variance in cost of producing air traffic control services at FAA operating sites. These cost functions are linear; changes in activity levels within the range of the datasets employed would not substantially alter the marginal costs of production. As a result, the marginal costs can be used directly to derive estimates of avoidable costs, and also can be confidently used in the Ramsey Pricing algorithms employed to allocate joint costs in this study.

NOTES

[1]In the future specifications, FSS services were added together only because the analysis of variance test indicated that there were no differences in the cost of producing future services.

[2]The distinction between users is suppressed in this presentation to improve clarity.

[3]It should be noted that the 1984 marginal costs for FSS services are reported as being equal for all FSS output. The reported results in Table 2.1 are weighted averages. The actual marginal costs reported below are different for the different FSS services for 1984. This was not the case for 1992, however.

[4]W. Dillon and M. Goldstein: Multivariate Analysis; John Wiley & Sons (New York, 1984) pps. 276-280.

[5]Automation Evaluation Study, AAT-12 (1979).

APPENDIX A

DATA FOR 1984 AND 1992 CALCULATIONS

This appendix describes the derivation of activity data used in the cost functions previously described. The database employed in the regression studies is also included in the appendix. A glossary of variable names preceeds the database.

TRACON and Tower Databases

The 1984 databases for TRACONs and Towers were modified to reflect actual activity exhibited by air carriers and commuters. FAA activity counts do not separately identify commuter operations.

OAG Data

The tapes for the North American Edition of the Official Airline Guide were run for the period October 1984 through September 1985. For each airport in North America, the total number of the following scheduled flights were counted:

- domestic flights by U.S. carriers,
- domestic flights by international carriers,
- domestic flights by U.S. commuter airlines (defined aircraft with fewer than 60 seats),
- domestic flights by international commuter airlines,
- international flights by U.S. carriers,
- international flights by international carriers,
- international flights by U.S. commuters,
- international flights by international commuters.

Adjustments to OAG Data

OAG and FAA official operations counts do not agree for the following reasons.

- o FAA counts do not explicitly identify commuter air carriers. Air taxis and commuter airlines are both found in the air taxi counts made by the FAA; in addition, some commuter flights are included in FAA counts of air carrier operations.
- o OAG data reflect scheduled operations. Not all scheduled flights actually take place.
- o FAA counts include charter and freight operations while OAG data do not. Form 41 data indicate that TRACONs and towers average only five freight operations per day.

The OAG data were reconciled to the FAA official counts since the latter represent the actual activity which took place at each Tower and TRACON in 1984. The following adjustments were made.

Since not all scheduled flights actually take place, a completion ratio of 0.985 was applied to all OAG flights. This is the average Form 41 completion rate for 1984.

The next set of adjustments were made at the site specific level. There are four relevant activity counts available at each Tower and TRACON:

- o FAA Air Carrier,
- o FAA Air Taxi,
- o OAG Air Carrier,
- o OAG Commuter.

The adjustments made depended on the relative sizes of the counts. The four possibilities and the adjustments made are shown in Figure 1. Each cell in the matrix is numbered:

- Cell 1: Both FAA air carrier and air taxi counts exceed the OAG counts. This indicates that some commuter operations are counted in the FAA air carrier operations counts and in the FAA air taxi counts. Therefore, the OAG figures are probably more accurate and are used for air carrier and commuter operations. The air taxi counts then become a residual as illustrated in the figure.
- Cell 2: FAA air carrier counts exceed OAG air carrier counts but OAG commuter counts exceed FAA air taxi counts. FAA air carrier counts include commuter operations and therefore the OAG air carrier counts are likely to be more accurate than those made by the FAA. Two further adjustments are possible. First, if the remaining FAA operations exceed the OAG commuter counts, then air taxi and commuter operations exist at the airport; therefore, commuter operations are assumed to be equal to the OAG counts. The residual then becomes the air taxi count. Otherwise, there are unlikely to be a significant number of air taxi operations at the airport, and commuters are allocated all remaining FAA air carrier and FAA air taxi operations.

Figure 1

ADJUSTMENTS TO SITE SPECIFIC ACTIVITY DATA

Air Carrier	FAA Air Taxi > OAG Commuter	FAA Air Taxi < OAG Commuter
FAA > OAG	1.) AC = OAGAC COM = OAGCM AT = (FAAAC + FAAT - OAGAC - OAGCM)	2.) Let X = FAAC + FAAAT - OAGAC AC = OAGAC If: X ≥ OAGCM then COM = OAGCM AT = X - COM Otherwise: COM = X AT = 0
FAA < OAG	3.) AC = FAAAC COM = OAGCM AT = FAAAT - COM	4.) AC = FAAC COM = FAAAT AT = 0

Legend:
AC = Air Carrier
FAAAC = FAA Air Carrier Operations
OAGAC = OAG Air Carrier Flights
COM = Commuter
OAGCM = OAG Commuter Flights
AT = Air Taxi
FAAAT = FAA Air Taxi Operations

- o Cell 3: OAG air carrier counts exceed FAA air carrier counts, but FAA air taxi counts exceed OAG commuter counts. Fewer OAG air carrier operations were completed than would be expected from the Form 41 completion rate. Therefore, the air carrier operations counted by the FAA are assumed to be correct. Because the FAA air taxi counts exceed the OAG commuter operations, there are probably significant numbers of commuter and air taxi operations. Therefore, commuter operations are assumed equal to the OAG commuter counts, with the residual being assigned to the air taxi category.
- o Cell 4: Both the OAG air carrier and commuter counts exceed the FAA counts. Both air carriers and commuters appear to complete fewer operations than would be expected from Form 41 completion rate data. Therefore, FAA air carrier and air taxi operations counts are used to represent flights made by air carriers and commuters. Air taxi operations are assumed to be zero.

This allocation process results in a reassignment of most air taxi and some air carrier operations to commuter airlines. While the process is not perfect, it should be more representative of the actual operations taking place at Towers and TRACONs.

The final adjustment made to the data was to allocate all remaining air taxi operations at each site to general aviation. At each site, four types of operations data were available:

- o Air Carrier Operations,
- o Commuter Operations,
- o General Aviation Operations (including air taxis),
- o Military Operations.

These operations data were then used in conjunction with site-specific cost data to estimate the marginal costs of FAA production.

ARTCC and FSS Databases

Activity counts for these facilities were modified to separately identify commuter operators based on the results for TRACONs and towers. Commuters were assumed to account for a proportionate share of air carrier activity at these facilities with one exception--they were assumed to account for zero overs at ARTCC's because of their relatively short stage lengths. These overs were assumed to remain the responsibility of other air carriers.

GLOSSARY

ACNEW	=	Estimated Air Carrier Operations
COM	=	Estimated Commuter Operations
GANEW	=	Estimated General Aviation Operations
GATSO	=	Estimated Total General Aviation Operation Plus
HANDL	=	Overs + 2* Departures
LEVEL 1	=	Tower Type Indicator
MILTDT	=	Total Military Operations
NOTGA	=	Estimated Total of Non-General Aviation Operations Plus Secondaries Plus Overs
NOTMI	=	Estimated Non-Military Handles
QIFRPB	=	IFR Flight Plans + Pilot Briefs
TACT	=	Total of Contacts, Flight Plans and Briefs
TQAC	=	Total Contacts
VFRFLT1	=	VFR Flight Plans

Table A1

COST AND AIRCRAFT ACTIVITY
DATA BY EN ROUTE CENTER (ARTCC) FOR 1984

LOCID	COSTTOT1	ACHANDL	ATHANDL	GAHANDL	MILHANDL
ZAB	26826100	582412	25797	212576	554407
ZAN	11838200	214760	81124	56983	47374
ZAU	27361200	848834	385363	595489	55977
ZBW	21350100	410116	273715	251078	185195
ZDC	31400700	1038971	157293	494132	287703
ZDV	25644500	581255	132976	236594	179964
ZFW	30488900	699954	197598	486780	339513
ZHN	7027799.	330326	19076	7701	63377
ZHU	29939500	587960	128616	538938	419575
ZID	21930600	606255	208334	490569	166798
ZJX	28286000	629359	144751	471442	360452
ZKC	29863100	684299	288849	511888	206296
ZLA	25652600	721265	232666	260353	285328
ZLC	19821900	377865	112410	177696	285808
ZMA	22217800	658922	211227	339710	153311
ZME	24788100	583516	205066	463043	235570
ZMP	24065200	549551	265757	443321	156542
ZNY	33411000	1053629	240641	437156	170404
ZOA	23456800	615871	160510	250154	327509
ZOB	31145500	989042	399295	589096	64136
ZSE	19002300	308842	254265	261928	149555
ZTL	36142800	1018733	235484	690125	152998

Table A2

COST AND AIR TRAFFIC ACTIVITY DATA
BY FLIGHT SERVICE STATION(FSS) FOR 1984

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
ABI	453569	22939	4593	32123
ABQ	1597943	57153	24052	127634
ABR	221337	20160	1542	7389
ABY	477070	13665	2537	46438
ACV	476011	33836	1385	20082
AGC	1514935	41627	3275	221612
AKN	465914	24380	4276	19588
AKO	247133	11764	2276	10876
ALB	1105879	20663	5762	155394
ALI	318229	21490	431	10405
ALW	905924	35455	8126	72597
AMA	776545	30482	4473	66403
AMG	285432	14772	1224	37738
ANB	524691	23789	3433	33360
AND	288896	20846	835	14293
AOO	506595	21405	725	42110
ART	366765	20845	1596	29844
ATL	3180667	49453	14392	365380
ATY	264645	16475	1082	10324
AUG	555942	38258	4494	51608
AUS	1391030	21220	9088	158745
AUW	577553	17461	2337	44210
AVP	610968	11667	2580	86207
AXN	584901	25860	3555	25851
BCE	99310	1604	344	1318
BDR	3383704	46195	20608	310748
BET	706136	54950	15610	21126
BFD	364729	19589	725	35333
BFF	368357	36038	4257	23379
BFL	490741	29231	5354	40830
BGR	502533	7296	4169	49305
BHM	1048273	22175	4384	149964
BIG	228712	13627	1918	5005
BIL	550701	23544	9444	46585
BKE	232068	11611	941	6450
BLF	447069	20676	650	34584
BLH	223072	28300	1667	7770
BLI	506567	53740	11470	21634
BNA	1508752	20713	6068	174896
BOI	817798	24542	6286	63421
BRL	427709	32066	1006	23170
BRW	474862	29048	7518	16264
BTM	265324	18656	1295	7279
BTT	334170	16690	4304	5629
BUF	1516346	25614	8691	195827
BWG	624560	28406	2517	55508
BYI	518799	25304	5509	36045
BZN	360864	30120	3078	11403

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
CDB	533012	23838	1259	10555
CDC	563578	28686	4841	52123
CDR	117041	4776	424	5296
CDS	236463	8100	351	3191
CDV	462584	26290	7411	7643
CEC	200223	8310	348	4978
CEW	425326	27526	2347	51474
CGI	646675	40141	4342	56062
CHI	3089513	69161	11544	379930
CHS	961340	37659	4775	98106
CID	1102656	20699	6200	125667
CLE	1884121	16396	5228	215584
CLL	354576	18912	3642	32188
CMH	1524771	23498	8617	187718
CMX	317235	12052	1984	9071
CNM	146889	13949	1405	6790
CNU	351615	16960	2075	23489
CON	617226	46471	6377	69634
COU	902035	19104	4473	70891
CPR	845878	26102	9719	71024
CRW	934513	23162	1859	102129
CSV	870600	21742	3563	103845
CTB	210003	7605	1395	3361
DAG	250190	38091	5069	14605
DAL	2306379	26805	10294	300593
DAN	248087	21820	793	11517
DAY	1209965	15968	2708	138178
DCA	4072804	64355	22035	413887
DDC	274163	23886	1125	17378
DEC	1225592	25960	6787	130923
DEN	3054002	94746	29401	245126
DET	1869758	30034	5751	243896
DHN	568151	13924	4699	50365
DHT	232386	12029	853	6767
DIK	245604	13681	1368	10356
DLG	227302	65475	3547	13364
DLS	228455	9310	787	4361
DMN	235751	11313	1679	5246
DSM	1222136	25783	3707	123363
DUG	188627	10735	4862	5269
DUJ	501330	20691	899	52008
DYR	311238	15785	1214	19485
EAT	441877	28809	2075	12329
EAU	417835	39526	1718	25802
ECG	112409	1411	487	6321
EED	113837	5840	458	1066
EGE	312583	13695	1841	11971
EKN	391190	13928	1964	37405

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	OIFRPB
EKO	406141	27915	2960	12310
ELD	216825	17320	647	11645
ELM	539916	16213	2742	86634
ELP	1155080	49434	18679	113694
ELY	132774	5721	407	1778
EMP	113372	5789	355	2265
ENA	910831	69898	27348	27377
EPH	201776	10713	457	3525
ERI	252924	2911	837	35295
ESF	208718	3183	919	16602
EWN	768865	32852	5754	73127
FAI	1539981	59042	19145	52515
FAT	1178883	31216	13449	119956
FDY	889579	41293	2799	101319
FLO	1088517	25453	8585	153598
FMY	1011944	19748	7800	241255
FTW	2341584	56669	12439	221121
FWA	572918	13576	2016	75517
FYV	442086	8728	1369	32918
GAG	176941	8314	412	4614
GCK	541306	32583	2462	26325
GFK	849040	23626	8404	97408
GFL	423770	28706	1001	23278
GJT	780619	37874	9424	51153
GKN	300376	16199	3124	6753
GLD	334203	19310	2437	16728
GLS	401994	77079	1206	22099
GNV	779455	25723	5784	81621
GRB	911312	16923	4175	65716
GRI	518359	24855	2805	34612
GSP	1178774	15038	4583	144745
GTF	1055881	33441	11241	43911
GUP	538638	38818	7181	22402
GWO	515333	19687	1624	40830
HAR	1318225	15877	8464	181051
HBR	172811	6113	1158	5789
HIB	647583	30308	5900	37914
HKY	1309412	51024	6162	204212
HNL	1998686	89311	68476	78298
HOM	366509	55762	22085	13603
HON	885271	41342	7122	70549
HOU	2761827	40455	11747	337635
HQM	338616	12676	856	3996
HRO	220936	18732	495	13271
HTS	497436	6429	1406	40104
HUF	706139	15606	3990	73609
HUL	326640	7017	1408	8375
ICT	1740151	21343	6400	146983

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
IDA	482929	14970	3827	23952
ILI	191560	33388	7823	7971
IND	2275178	40580	6637	210372
INK	199435	5616	257	2617
IPL	311872	44432	2095	14653
IPT	497296	7887	1105	53714
ISP	2441421	22820	9369	283778
JAN	925290	22171	3802	98763
JAX	928199	23660	15527	114431
JBR	216254	27598	1041	16737
JLN	303999	17042	1249	19309
JMS	271598	14412	1194	9814
JNU	759688	45678	31317	13500
JST	252315	23226	307	37119
JXN	293856	4558	966	41876
KTN	471189	83093	3416	10349
LAF	487621	12175	2959	48474
LAN	394361	15313	3646	61092
LAR	331211	22698	2063	13308
LAS	1856152	72139	24081	133774
LAX	2685468	93168	23857	215396
LBB	437180	7788	2882	43563
LBF	493377	34157	3972	29109
LCH	471633	10572	1756	27573
LEB	469787	12448	1655	31301
LFK	371441	29066	2231	35347
LFT	717424	15615	2895	85033
LHX	299455	11659	1831	6591
LIT	1609690	24635	8311	172477
LNK	472964	14131	4007	50320
LOL	147530	1147	84	412
LOU	1053818	25232	5898	168013
LOZ	479634	29427	1521	40047
LSE	453123	12260	2975	32549
LUK	828734	24073	2750	151171
LVM	197537	6820	928	6723
LVS	208228	8741	734	3238
LWT	299825	14037	1508	5561
MAF	537363	10788	2643	52946
MBS	779087	14093	3851	94835
MCB	403835	16391	2530	24962
MCG	611818	35870	9521	14615
MCN	750878	15731	3298	59714
MCW	555903	33877	2896	57787
MEI	442976	10579	2107	32284
MEM	1386870	33156	3796	156594
MFE	484835	33447	1390	47366
MGM	609087	15140	4256	56444

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
MGW	506961	5814	1006	26345
MHK	294067	40792	1260	18940
MIA	4349254	232101	93083	366257
MIV	1340271	38863	6061	221434
MKC	2082136	45481	8866	193006
MKE	1468449	20217	7375	159706
MKL	393755	25716	1051	26296
MLB	794577	33999	23550	77892
MLC	444929	25715	1375	11586
MLS	395086	25661	6005	24807
MLU	368836	8206	1513	34848
MOB	760394	17058	4488	88846
MOT	519348	19032	6685	35328
MPV	679817	25675	3417	45699
MQT	334027	24868	1101	27342
MRB	572159	29353	6003	131955
MSL	752773	40471	4882	59216
MSO	335402	9650	3017	12968
MSP	2081671	44448	12149	228044
MSS	397096	13338	1340	30793
MWL	80243	8115	219	2240
MYV	280848	34459	2516	13290
NEW	1707434	31384	7107	197406
OAK	2920345	104846	33615	262631
OKC	2339580	50462	12949	232824
OMA	1341754	38158	5318	125541
OME	723750	57055	11423	34567
ONT	2146911	37387	26540	220141
ORL	1375817	40068	17691	227249
ORT	355064	9615	3534	4636
OTH	670035	33543	4025	29888
OTM	293534	26548	2215	37794
OTZ	626935	47132	17100	19076
PAH	389503	37807	1258	44743
PAO	127053	20658	1985	9778
PBF	77217	11877	433	5542
PDX	2229111	52585	14737	181506
PHF	1259094	16659	6126	146523
PHX	2288925	119088	48568	178748
PIE	1410549	33956	12391	227472
PIR	395148	29697	2726	19875
PKB	523068	10643	2224	61751
PLN	380466	20732	2416	26560
PNC	212978	21221	613	8624
PNE	1569490	15929	8191	218034
PNS	489361	6176	5841	48126
POU	1063153	27481	7010	182038
PRB	464582	55230	5952	31935

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
PRC	647598	66156	5322	14556
PSB	392977	11991	578	45967
PSX	201802	15708	1624	11255
RAP	447142	14010	5663	29448
RBL	892618	54741	9438	84755
RDM	819366	43427	5665	37212
RDU	1600214	42365	8585	270012
RFD	689844	11467	2958	72729
RKS	551943	30322	2117	12500
RNO	899477	23570	9840	66910
ROA	878872	12419	2884	85107
ROW	492081	17494	4030	32050
RSL	372437	18455	1939	29073
RST	321900	10102	1798	32692
RWF	450253	16097	1781	32189
RWI	294007	24158	579	16663
RWL	227213	11252	1448	5235
SAC	1660369	40002	18681	152619
SAN	1874351	49085	38759	155940
SAT	2542107	49904	15372	260311
SAV	962375	19504	7512	107409
SBA	909383	47179	12414	79292
SBN	1446486	25814	5589	159697
SBY	484630	48243	3777	64063
SCC	499638	42511	2912	24709
SCK	364543	17096	2652	21855
SEA	2833561	68098	22366	202444
SFF	551019	13681	6059	51582
SGF	534737	17181	3347	58087
SHR	340985	26888	3392	32863
SHV	1364805	29290	6032	126337
SIT	647497	55319	16095	12177
SJU	1646350	152964	64177	68407
SLC	1841575	50840	15760	139698
SLN	446520	23409	1678	25124
SNS	708011	24924	7677	47683
SNY	130286	6051	590	2924
SPS	544530	11845	3846	34014
SSI	367781	32022	4063	30650
STL	2224994	47231	7439	215480
TAD	330992	10664	3276	22833
TAL	226330	11666	1926	2738
TCC	337148	9564	1436	11408
TCL	315315	14876	3320	41389
TCS	70289	2415	130	1652
TDO	53082	1141	100	457
TEB	1725228	27207	6041	243590
TKA	180076	30770	4310	4800

Table A2 Continued

LOCID	COSTTOT1	TQAC	VFRFLT1	QIFRPB
TLH	750295	24712	6018	90343
TPH	322842	16852	1287	6161
TRI	277025	0	1376	38227
TRM	354792	27380	3306	23868
TUL	1492235	26093	8029	180070
TUS	731246	28590	16814	50647
TVC	593635	15177	2857	41807
TYS	809277	15533	3215	105285
UCA	628320	14183	2320	80172
UIN	638672	35786	2644	61933
UKI	430813	34432	2466	20644
VIH	266392	14437	1570	17116
VLD	383177	25596	1508	29089
VRB	971433	40151	11110	102575
WJF	969825	42433	11867	88417
WRL	400068	21798	3920	16531
YAK	270180	12185	3227	4585
YNG	362012	5108	934	45931

Table A3

COST AND AIR TRAFFIC ACTIVITY DATA BY TOWER FOR 1984

LOCID	COSTTOT1	ACNEW	COM	GANEW	MILTOT	LEVEL1
ABY	611207	2441	3414	49075	9972	0
ADQ	377733	2563	8739	20358	12068	1
ADS	782746	0	949	158340	103	0
AGC	717029	0	256	120012	1022	0
AKN	444770	1741	13546	24430	4791	1
ALN	426004	8	0	59304	5361	1
ALW	482361	0	5105	47994	466	1
APA	1115730	0	0	365312	890	0
APC	469958	0	0	123540	476	0
ARB	287544	0	0	90163	496	1
ARR	579407	5	0	134743	219	0
ASE	397047	0	9874	33408	75	1
ATW	391809	3371	4500	41721	120	1
BAF	573696	16	0	118009	14756	0
BDR	572333	0	12705	147386	2459	0
BED	780351	0	15236	209571	2476	0
BET	416438	2837	40288	36878	1118	1
BFI	1052923	510	1873	373718	2474	0
BJC	656040	1	0	156645	1217	0
BKL	372322	0	9718	58606	777	1
BMG	299540	0	4574	29067	276	1
BMI	361343	0	9612	51137	665	1
BRO	736329	2722	183	50972	5017	0
BTL	511338	0	5124	29285	7583	1
BVY	417764	0	0	126964	230	0
CCR	589047	0	10684	228766	1149	0
CDW	651532	2	0	247927	292	0
CGX	330006	0	4880	54675	1592	1
CHO	477890	2756	14302	34991	1649	1
CIC	258901	0	6393	36384	316	1
CLL	570804	0	8619	77853	5870	1
CNO	514033	2	0	202243	537	0
COU	430012	2594	7095	37012	2525	1
CPS	581349	0	4061	122030	2523	0
CRG	408528	86	0	99811	11637	1
CRQ	497979	0	6327	186860	2050	0
CSM	432000	2	0	21374	16184	0
CYS	632899	122	9681	45506	12886	0
DBQ	414940	0	12430	43754	378	1
DEC	711777	0	10951	60263	11544	0
DET	876321	0	10114	134395	483	0
DHN	558010	3910	4464	30717	65951	1
DPA	691728	0	0	192194	317	0
DTN	372347	0	0	58940	219	1
DVT	598146	2	0	233854	6225	0
DWH	511797	14	0	200318	1582	0

Table A3 Continued

LOCID	COSTTOT1	ACNEW	COM	GANEW	MILTOT	LEVEL1
DXR	369671	0	0	120422	250	0
EMT	510292	0	0	202077	86	0
ENA	357831	0	44684	39062	3178	1
ESF	373552	1178	9672	29078	2047	1
EWB	505903	0	14507	95541	2335	1
EYW	355355	0	25615	33917	1474	1
FCM	646544	0	0	165630	671	0
FFZ	482748	0	0	126847	5263	0
FLO	457802	0	8156	17417	2805	1
FMY	575722	0	5406	109923	558	1
FOE	475940	3321	10082	27373	16384	1
FRG	959525	0	6228	140535	825	0
FTW	1075971	0	485	255975	1212	0
FTY	700111	0	252	145385	5620	0
FUL	557289	0	0	186189	34	0
FXE	592137	0	0	180523	96	0
FYV	554911	0	23235	29436	378	1
GCN	290787	1586	19832	73403	516	0
GFK	541239	6383	1109	191246	399	0
GJT	633097	3401	9371	60690	521	0
GLH	377086	1253	207	10784	3299	1
GMU	514465	0	0	71399	203	1
GNV	459130	4273	7460	69857	1542	0
GON	475313	0	24218	78716	5039	1
GRI	363945	1578	3037	17617	1292	1
GYR	311936	0	0	151259	2198	0
HFD	529250	0	662	137938	1516	0
HGR	416615	0	5486	48278	5162	1
HHR	526485	53	0	132990	132	0
HIO	570366	0	0	140619	1965	0
HKS	374011	0	0	48646	8300	1
HLG	459645	0	0	22671	4433	1
HLN	501160	4721	3751	36532	11490	1
HRL	426465	10142	1020	63391	4481	1
HUM	508937	0	71986	62999	479	0
HUT	546257	0	4313	64826	1393	0
HVN	819532	2	42611	103152	532	0
HWD	668221	14	0	253094	145	0
HWO	621516	0	0	180104	3186	0
IAG	751193	491	0	81275	28496	0
IDA	386250	2694	11681	33830	642	1
ILG	741639	528	1801	136174	17334	0
INT	646850	331	2707	84185	315	1
IPT	506903	0	6186	36431	530	1
ISO	424159	2866	315	25763	2042	1
ITH	414825	4079	4878	74730	627	1

Table A3 Continued

LOCID	COSTTOT1	ACNEW	COM	GANEW	MILTOT	LEVEL1
JLN	329167	1322	2653	15326	170	1
JNU	396837	6517	16741	76873	2134	1
JVL	597620	0	4658	104532	8156	0
JXN	525718	0	2128	56152	892	0
KCK	550248	0	0	69878	74	1
KOA	337972	16384	12249	33356	16855	1
LAF	566831	0	3162	93094	510	0
LAW	499483	0	6708	28207	23635	1
LEB	457100	0	15087	46629	350	1
LGB	1469977	8328	1647	438852	2104	0
LIH	364394	18548	18701	53986	1678	1
LMT	444113	689	2537	43373	17311	1
LNS	444031	0	13807	118673	12263	0
LOU	824681	0	0	175203	1777	0
LSE	555871	3511	7094	46577	831	1
LUK	737377	4	0	147624	1017	0
LVK	450954	0	0	176927	858	0
LWM	453890	0	1584	125324	303	0
LWS	415761	0	12502	38629	706	1
LYH	499885	2847	9927	55602	668	1
MDH	569067	79	3676	192416	266	0
MDT	902320	7809	22523	86090	16525	1
MFE	679812	6433	61	70366	1325	0
MFR	758835	5132	5760	93935	875	0
MGW	463906	0	11152	53071	4314	1
MHT	589197	532	22462	118563	2306	0
MIC	590759	0	0	136596	919	0
MIE	406124	0	2692	46570	546	1
MKK	174182	0	34004	16054	3107	1
MLB	819395	10679	2227	188230	3013	0
MMU	662149	104	0	203251	3255	0
MOD	458229	0	6523	92899	1141	0
MOT	367102	4035	597	42158	2145	1
MRI	891523	0	1663	372309	169	0
MSO	532675	8286	1145	54121	1001	1
MWC	539900	0	0	84472	541	0
MWH	581807	0	1371	122867	12204	0
MYF	743989	0	0	251273	254	0
NEW	774644	15	0	214916	6333	0
OGD	371515	18	0	71540	2875	1
OJC	421860	0	0	84509	79	1
OPF	902871	1	0	156043	10153	0
ORH	623277	0	9653	79376	1253	1
OSH	600528	1432	6836	104788	3687	0
OSU	654355	0	0	126253	10519	0
OWD	528337	0	0	146223	579	0

Table A3 Continued

LOCID	COSTTOT1	ACNEW	COM	GANEW	[illegible]OT	LEVEL1
OXR	512022	0	16088	115768	176[illegible]	0
PAE	575017	0	33	120875	10079	0
PAO	500190	0	0	201640	19	0
PDK	773191	0	0	203449	265	0
PFN	543717	3995	13298	105676	7045	1
PHF	817614	0	10790	95279	66166	0
PIE	788524	10185	2985	155060	8799	0
PIH	452058	0	14375	32914	700	1
PKB	553326	0	7189	64720	8907	1
PMP	489242	0	0	105485	213	0
PNE	599521	0	3020	148885	13067	0
POC	638466	0	0	204902	208	0
POU	660681	0	11481	95861	2422	0
PSC	549778	2460	21207	57974	1115	0
PTK	735593	0	709	296750	864	0
PWA	718691	0	0	146340	160	0
PWK	706768	0	988	199066	76	0
RAL	441609	0	6157	147267	458	0
RAP	465708	7941	5144	42109	6571	1
RBD	662313	0	0	115080	1983	0
RDD	339708	2703	6418	91226	1652	1
RHV	524634	0	0	218712	44	0
RNT	472761	0	0	146471	254	0
ROW	585104	0	9330	36490	17720	0
RVS	503932	0	0	190754	6	0
SAC	834530	0	0	144139	642	0
SAF	473725	0	2059	66986	5786	1
SDL	509759	0	2698	149812	1556	0
SDM	337606	0	0	112800	17441	0
SEE	630114	0	0	196856	279	0
SFF	396870	1	0	86153	87	1
SJT	874752	0	8591	67886	18672	0
SLE	536351	0	2029	53637	7840	1
SLN	335350	0	5049	33805	3568	1
SMO	515083	0	0	203527	505	0
SMX	283081	0	17522	57169	981	1
SNS	353000	0	0	85264	1285	1
SPG	328732	0	0	55252	452	1
SQL	578796	0	0	174747	80	0
SRQ	737162	18998	19194	114214	757	0
SSF	229600	0	0	51786	1254	1
STJ	282593	0	0	15356	7591	1
STP	460793	6	0	92179	9889	0
STS	554160	0	2122	110966	652	0
STX	416479	17990	0	43750	3830	1
SUS	602734	0	0	159700	786	0

Table A3 Continued

LOCID	COSTTOT1	ACNEW	COM	GANEW	MILTOT	LEVEL1
TCL	359501	939	1905	31472	2456	1
TEB	1007321	0	3522	271932	497	0
TIW	467575	2	0	79680	927	0
TMB	942429	0	0	312008	380	0
TOA	822468	0	0	262296	350	0
TTD	345256	1	0	67221	529	1
TTN	680536	1066	6976	133954	9132	0
TUT	3918	0	8214	672	1	
TVC	386045	4663	7898	61013	9907	1
TVL	246641	2137	2334	36116	751	1
TWF	371714	65	7092	39840	553	1
TXK	451756	0	6145	36015	2455	1
TYR	602770	0	17791	66249	326	1
VGT	474346	0	5331	118732	293	0
VNY	1107026	2	0	579153	3792	0
VRB	660768	0	3411	129833	159	0
WJF	276238	0	3502	93954	4464	1
YIP	858339	5750	1925	144314	249	0
YKM	579698	0	17326	61798	7057	0

Table A4

COST AND AIR TRAFFIC ACTIVITY ESTIMATES BY TRACON FOR 1984

LOCID	COSTTOT1	NOTGA	GATSO
ABE	1882115	36581	104048
ABI	1263882	51799	88149
ABQ	2517647	127956	113492
ACK	1193722	65179	96277
ACT	1265044	15699	52306
ACY	2275505	51305	128576
ADW	2392345	103939	25217
AGS	1628325	20437	58871
ALB	2670105	95228	116367
ALO	1231833	30522	51053
AMA	1792710	51344	73943
ANC	2806051	170181	103602
ATL	9288437	633521	202123
AUS	2636469	112577	192763
AVL	1552636	22120	70853
AVP	1651160	29269	71007
AZO	1821203	30603	102502
BDL	3274630	127964	151259
BFL	1387330	25128	118657
BGM	1582277	37215	49601
BGR	1651170	49290	59198
BHM	2944908	70569	181191
BIL	1494645	31012	89598
BIS	1213430	20643	50580
BNA	2917790	87213	155706
BOI	1905881	59800	91992
BOS	5958466	348689	162228
BPT	1513334	32241	65041
BTR	1674685	30796	149537
BTV	1902202	76933	96188
BUF	3163656	103166	94337
BUR	3375262	80277	254904
BWI	4222575	243698	177423
CAE	1824638	44796	106483
CAK	1873283	40852	130747
CHA	1855717	19169	113476
CHS	2329137	89953	78132
CID	1607378	43055	88206
CKB	1382555	27306	71506
CLE	4153216	191836	162322
CLT	4137919	206171	169388
CMH	3830390	110108	242986
CMI	1678538	40944	134773
COS	2048212	86095	102415
CPR	1071041	18152	55539
CRP	2463352	98954	102648
CRW	2141666	33880	102241
CSG	1600922	45817	84360

Table A4 Continued

LOCID	COSTTOT1	NOTGA	GATSO
CVG	3057027	130975	134247
CXY	57222	146146	
DAB	2351335	27241	209426
DAL	1556896	113525	206194
DAY	3805341	151647	163425
DCA	6154486	373916	124013
DEN	6110046	433136	157975
DFW	9057182	649993	277161
DLH	1306239	27299	31349
DSM	2971136	53804	136406
DTW	5835639	307142	207125
ELM	1268059	21427	60047
ELP	2423898	74454	144481
ERI	1522861	33748	78154
EUG	1366199	16779	88431
EVV	1653150	40407	97488
EWR	8531418	330241	163605
FAI	2003441	48980	86010
FAR	1195118	24461	67424
FAT	2104873	49753	187134
FAY	1754199	67430	88820
FLL	1803821	127459	154564
FNT	1858037	29082	113968
FSD	1150978	29318	61926
FSM	1244702	31758	56488
FWA	1997210	37907	114203
GEG	2126140	72537	81558
GGG	1301429	12933	95181
GPT	1617093	59443	60840
GRB	1870453	41701	74432
GRR	2046959	42862	116278
GSO	2690294	69240	167828
GSP	2017513	34763	104749
GTF	1398837	26923	44882
HNL	3854071	261611	113085
HOU	1456645	119287	209861
HPN	1360516	27837	179224
HSV	1848327	37871	101444
HTS	1333520	18430	95000
HUF	1277417	22187	83446
HYA	1680613	105503	103325
IAD	3260664	117925	166592
IAH	7035167	398335	254775
ICT	2514447	62886	159278
ILM	1537150	33899	63917
IND	4109431	110516	171632
ISP	1047581	35601	188578
ITO	1038840	41512	17647

Table A4 Continued

LOCID	COSTTOT1	NOTGA	GATSO
JAN	1881969	56733	80612
JAX	3646123	198585	130187
JFK	8959932	308926	189976
KWA	20299	3183	
LAN	1733968	37583	123749
LAS	4030242	180242	172596
LAX	8239019	474664	137940
LBB	3461018	197307	94921
LCH	1315828	31246	71302
LEX	1895437	28630	98007
LFT	1876336	30597	161928
LGA	8538799	340066	160410
LIT	2430071	74195	139026
LNK	1556949	38841	99043
MAF	2043579	34300	115882
MBS	1747903	24232	68391
MCI	3664938	209459	104180
MCN	1324924	45885	92381
MCO	4049940	184546	163700
MDW	1446771	46458	162551
MEI	1879771	69303	41535
MEM	4377056	186881	147807
MFD	1277031	29428	69257
MGM	1560369	52657	82460
MIA	8304918	407778	224834
MKC	824685	11537	138521
MKE	3728948	108401	132276
MKG	1390529	21237	68608
MLI	1795346	49987	89416
MLU	1239195	14962	100292
MOB	2008956	67565	76221
MRY	1427271	30309	101903
MSN	1848651	40435	128825
MSP	3896632	246790	165606
MSY	3905488	158805	136480
OAK	6439299	291035	394740
OGG	1380820	123822	27912
OKC	4171787	120765	177583
OLM	1766443	18210	102898
OMA	2974766	143522	175270
ONT	4091177	163909	194511
ORD	10369300	747934	201066
ORF	3898914	211107	116596
ORL	887408	7725	146523
PBI	2882832	113809	210843
PDX	3891514	141596	137322
PHL	5952054	299604	197922
PHX	6264036	424612	218370

Table A4 Continued

LOCID	COSTTOT1	NOTGA	GATSO
PIA	1684252	33838	83498
PIT	6496230	311897	138795
PMD	4611164	285844	40445
PNS	3372979	282529	99781
PSP	1313939	27503	84983
PUB	1129129	35132	60701
PVD	2337223	107583	228003
PWM	1911203	54352	83370
RDG	1237269	25388	98634
RDU	2805104	94521	139575
RFD	1710449	33490	160503
RIC	2690856	100104	110401
RNO	1961941	53812	109827
ROA	2047970	31746	123036
ROC	2687198	55725	164394
RST	1074664	23555	62798
RSW	1682801	69810	61723
SAN	5164812	318346	184423
SAT	4404087	221355	169454
SAV	1899879	52219	109869
SBA	1345196	40638	201163
SBN	1648834	46348	129667
SCK	1374008	22401	113724
SDF	2601709	91503	153162
SEA	3944122	212418	123097
SFO	2415720	325623	79957
SGF	1193995	36251	64514
SHV	1861797	64864	85754
SJC	3722921	306206	365887
SJU	5168787	225397	117849
SLC	3732220	179351	134430
SMF	4693258	247812	109731
SNA	4869361	181441	618166
SPI	1560406	39754	90104
STL	4648841	349396	137314
STT	756543	30930	63805
SUX	1096080	26189	41340
SYR	2522882	98955	71687
TLH	1893358	58163	92159
TOL	1930312	43809	109094
TPA	5147510	290585	231734
TRI	1707391	23142	93439
TUL	2847438	100731	144285
TUS	2445246	136847	271922
TYS	2294600	52547	118426
UCA	1869204	43819	86683
YNG	1849303	38095	108042
ZUA	969127	19025	2726

Table A5

COST AND AIRCRAFT ACTIVITY ESTIMATES
BY EN ROUTE CENTER(ARTCC) FOR 1992

LOCID	COSTTOT	NOTMI	MIHAND
ZAB	29792300	1429	518
ZAN	12871400	570	51
ZAU	34217300	2221	60
ZBW	21887000	1356	180
ZDC	32329100	2210	222
ZDV	21086400	1282	152
ZFW	33892300	1970	369
ZHN	15322200	530	99
ZHU	35001700	2016	440
ZID	29366800	1728	162
ZJX	30724800	1748	398
ZKC	30237900	1871	207
ZLA	31124500	1682	322
ZLC	17520300	990	159
ZMA	27952900	1744	158
ZME	27740800	1548	257
ZMP	30192300	1753	159
ZNY	33376600	1930	162
ZOA	27576700	1425	325
ZOB	24823400	2257	77
ZSE	19658300	1278	153
ZTL	36825200	2510	174

Table A6

COST AND AIR TRAFFIC ACTIVITY ESTIMATES
BY FLIGHT SERVICE STATION(FSS) FOR 1992

LOCID	COSTTOT	TACT	LOCID	COSTTOT	TACT
0Q7	3461181	759370	HNL	1380128	360276
ABQ	4126914	697158	HON	1658240	293441
ANB	3710532	753203	HUF	4176878	736893
AND	3342866	640791	ICT	3086803	539944
AOO	2713342	547863	IKK	3046890	587556
BDR	3309027	651452	IPT	3693609	653963
BGR	1848619	330791	ISP	3636712	838288
BIL	2252083	446989	JNU	1849193	436184
BNA	3292875	558603	LAN	3517977	682859
BOI	1447171	230552	LIT	2756640	450149
BTV	3134148	446213	LOU	2412602	532344
CDC	1970436	413496	MCN	6577619	1133856
CLE	2836747	504092	MIV	3059600	651319
COU	2614033	516537	MKL	1712202	306241
CPR	2219523	376294	MLC	3761482	833778
CXO	3841405	828622	MMV	2277297	431094
DAY	3268809	609816	MYF	1549832	331686
DCA	5150056	1126765	OAK	3132832	681833
DEN	3510269	656023	OLU	2689673	467346
DRI	4159638	842358	PIE	5905927	1444439
EKN	3429843	655616	PNM	3210803	542072
ELM	3096227	610539	PRC	2646529	622853
ENA	5442287	1109759	RAL	2866401	602545
FAI	3483751	647098	RDU	4146613	899390
FOD	3258683	622834	RNO	1929326	414684
FTW	6152192	1287473	SEA	3442380	717342
GFK	1790033	331236	SJT	4863546	1097836
GNV	3172202	611670	SJU	1337804	
GRB	3094432	612987	STL	3570555	655700
GWO	1779135	335868	TMB	4843563	
HHR	3388686	891695			

Table A7

COST AND AIR TRAFFIC ACTIVITY
ESTIMATES BY TOWER FOR 1992

LOCID	COSTTOT	ACNEW	COM	GANEW	MILTOT	LEVEL1
ABY	742674	3110	4350	71025	9428	0
ADQ	352667	3171	10813	28494	13304	1
ADS	860773	0	1215	292218	135	0
AGC	844988	0	320	152199	1022	0
AKN	428024	2324	18079	30193	3979	1
ALN	375275	34	0	65011	3398	1
ALW	340126	0	6318	54095	315	1
APA	1251204	0	0	433023	871	0
APC	602578	0	0	180814	373	0
ARB	430384	0	0	155313	1464	1
ARR	657960	4	0	256256	202	0
ASE	371932	0	12213	47310	98	1
ATW	353864	5951	7945	57238	54	1
BAF	722055	8	0	131544	12685	0
BDR	745650	0	28991	187856	2558	0
BED	929263	0	17197	278779	2384	0
BET	527596	4274	60703	49858	1492	1
BFI	1326928	600	2203	397184	2883	0
BJC	729756	2	0	234512	1368	0
BKL	503178	0	9361	82529	827	1
BMG	382342	0	5500	45012	305	1
BMI	347508	0	12735	73144	614	1
BRO	1065330	3630	244	77464	4864	0
BTL	396396	0	5729	37303	7983	1
BVY	601208	0	0	188322	484	0
CCR	851616	0	9629	282151	1224	0
CDW	754152	5	0	263926	661	0
CGX	377063	0	86928	90619	1001	1
CHO	378598	4694	24358	59369	1649	1
CIC	361680	0	12491	74411	505	1
CLL	513527	0	10621	103995	6076	1
CNO	758201	0	0	270213	517	0
COU	363129	4745	12978	64392	2459	1
CPS	736868	2679	5579	139442	2679	0
CRG	427895	49	0	152646	10980	1
CRQ	814564	0	9233	245026	2336	0
CSM	588503	3	0	32817	21118	0
CYS	856924	158	12510	56374	11197	0
DBQ	407970	0	15245	59315	454	1
DEC	648423	0	15474	83851	9625	0
DET	971865	0	10317	182609	328	0
DHN	467522	4394	5016	51401	65951	1
DPA	802935	0	0	312259	346	0
DTN	493183	0	0	94710	315	1
DVT	792413	3	0	382296	2362	0
DWH	723184	19	0	212776	1393	0
DXR	662376	0	0	180014	397	0
EMT	700666	0	0	231303	79	0
ENA	429530	0	53747	72268	3098	1
ESF	458427	1577	12949	46138	2192	1
EWB	448612	0	19463	116248	3131	1
EYW	421771	0	36471	41744	1597	1

Table A7 Continued

LOCID	COSTTOT	ACNEW	COM	GANEW	MILTOT	LEVEL1
FCM	768162	0	0	244436	564	0
FFZ	693345	0	0	240403	8465	0
FLO	468751	0	21745	37505	2372	1
FMY	526619	0	7568	135880	683	1
FOE	510470	3036	9216	51592	17604	1
FRG	750642	0	8895	237732	657	0
FTW	1238016	0	2467	331827	1174	0
FTY	868853	0	215	206637	5016	0
FUL	709661	0	0	204785	33	0
FXE	855699	0	0	211607	97	0
FYV	470418	0	32810	53812	429	1
GCN	694510	2412	30162	110662	924	0
GFK	731917	8859	1539	282373	274	0
GJT	808582	5207	14349	93753	584	0
GLH	379248	3419	565	29062	5900	1
GMU	402405	0	0	110937	170	1
GNV	647682	7524	13137	105236	1555	0
GON	433230	0	31637	111083	4413	1
GRI	440723	9339	17975	76204	5819	1
GYR	610400	0	0	201731	1046	0
HFD	773158	0	833	198072	2157	0
HGR	354742	0	1659	87102	9225	1
HHR	658519	50	0	162254	189	0
HIO	690897	0	0	196252	3659	0
HKS	276627	0	0	58487	8677	1
HLG	394978	0	0	36293	4433	1
HLN	469681	6797	5400	50400	9860	1
HRL	428775	12942	1302	65085	4490	1
HUM	641796	0	112958	77546	204	0
HUT	775708	0	6351	104312	1368	0
HVN	901131	2	43851	145742	358	0
HWD	835777	17	0	317172	131	0
HWO	787402	0	0	250998	2387	0
IAG	775837	3104	0	124864	27074	0
IDA	334157	4601	19949	60452	1888	1
ILG	946674	631	2152	220861	16051	0
INT	466522	352	2879	112501	342	1
IPT	362620	0	7719	48801	315	1
ISO	370205	5065	557	37106	2311	1
ITH	399226	5152	6160	90666	959	1
JLN	336234	3929	7884	35099	225	1
JNU	447282	9297	23881	114628	1579	1
JVL	620392	0	3679	101668	5919	0
JXN	616277	0	2210	85712	1422	0
KCK	1					
KOA	370804	20305	15181	48483	17130	1
LAF	655238	0	8961	124673	399	0
LAW	418750	0	10516	43140	23762	1
LEB	335576	0	20680	68530	783	1
LGB	1417353	7893	1562	475707	1909	0
LIH	509744	30324	30575	88339	9047	1
LMT	566407	1132	4170	61846	16512	1

Table A7 Continued

LOCID	COSTTOT	ACNEW	COM	GANEW	MILTOT	LEVEL1
LNS	790461	0	20688	179794	12263	0
LOU	752516	0	0	272153	1613	0
LSE	635725	4287	8662	59583	714	1
LUK	886828	7	0	232943	1153	0
LVK	684855	0	0	241738	532	0
LWM	640861	0	2491	169022	393	0
LWS	366603	0	20958	54621	536	1
LYH	451846	4179	14572	78096	705	1
MDH	583466	74	3450	255331	198	0
MDT	948932	11413	32918	133254	18852	1
MFE	762594	6967	66	104897	1438	0
MFR	796494	7326	8324	109276	652	0
MGW	357546	0	21569	85965	4314	1
MHT	950169	655	27644	168841	4035	0
MIC	718059	0	0	213361	786	0
MIE	364920	0	4767	73440	1527	1
MKK	247840	0	36191	19755	3772	1
MLB	1005104	12235	2551	296351	3436	0
MMU	730062	262	0	252671	3477	0
MOD	631171	0	11161	142627	996	0
MOT	320224	5923	876	64596	2482	1
MRI	974924	0	2798	490874	48	0
MSO	486087	10601	1464	59145	1658	1
MWC	570619	0	0	113977	649	0
MWH	1099435	0	3705	149400	11394	0
MYF	846457	0	0	331429	187	0
NEW	1031924	21	0	344433	6333	0
OGD	376244	17	0	116164	2376	1
OJC	363825	0	0	130457	91	1
OPF	1154960	1	0	218733	11320	0
ORH	410310	0	7813	103929	2000	1
OSH	387362	1552	7406	150222	4170	0
OSU	874605	0	0	203263	12264	0
OWD	700434	0	0	198621	559	0
OXR	698201	0	26502	128727	930	0
PAE	719311	0	55	179139	8032	0
PAO	687063	0	0	239440	42	0
PDK	854681	0	0	280812	144	0
PFN	566031	8800	29293	127089	7818	1
PHF	802874	0	16959	150209	75362	0
PIE	893704	8021	2350	198813	10558	0
PIH	358883	0	24634	39797	805	1
PKB	425338	0	10358	96411	8907	1
PMP	559455	0	0	151011	1500	0
PNE	822116	0	3225	180315	17062	0
POC	735220	0	0	258929	247	0
POU	794037	0	15206	161357	2422	0
PSC	922153	4732	40790	84473	1072	0
PTK	995870	0	1107	411037	1200	0
PWA	767633	0	0	193446	192	0
PWK	801113	0	1158	319138	44	0
RAL	740792	0	8176	220957	457	0

Table A7 Continued

LOCID	COSTTOT	ACNEW	COM	GANEW	MILTOT	LEVEL1
RAP	415329	9510	6160	62460	5383	1
RBD	621897	0	0	158239	1983	0
RDD	405413	2759	6550	133144	1760	1
RHV	691765	0	0	310558	29	0
RNT	648235	0	0	211843	401	0
ROW	776770	0	12418	46428	13944	0
RVS	744193	3	0			
SAC	818438	0	0	198290	752	0
SAF	326348	0	2931	77789	7072	1
SDL	640267	0	2811	203100	2723	0
SDM	616495	0	0	164491	30688	0
SEE	706390	0	0	271474	417	0
SFF	313670	5	0	139834	93	1
SJT	936580	0	13456	98342	20750	0
SLE	467947	0	2323	72436	8203	1
SLN	335357	0	7467	65928	3554	1
SMO	769663	0	0	223508	326	0
SMX	379289	0	24787	92343	977	1
SNS	346977	0	0	116214	1675	1
SPG	301362	0	0	120595	640	1
SQL	671015	0	0	223551	80	0
SRQ	1106564	22754	22989	137259	889	0
SSF	314485	0	0	90909	3150	1
STJ	378895	0	0	42026	10956	1
STP	699466	10	0	147523	9889	0
STS	670125	0	3166	171078	683	0
STX	457477	21287	0	49658	3872	1
SUS	897278	0	0	272019	1573	0
TCL	415825	1310	2658	58360	4000	1
TEB	1008937	0	630	310535	341	0
TIW	560008	25	0	183403	1849	0
TMB	1196663	0	0	480358	447	0
TOA	986329	0	0	346499	430	0
TTD	322236	2	0	84730	706	1
TTN	797642	1023	6698	235861	9174	0
TUT	405978	3696	0	8738	686	1
TVC	379292	6132	10386	88534	10523	1
TVL	324106	3300	3605	55038	856	1
TWF	452345	101	11005	72858	670	1
TXK	424730	0	10879	66012	3394	1
TYR	505039	0	21937	101350	515	1
VGT	519435	0	6567	158489	208	0
VNY	1310464	1	0	510721	3730	0
VRB	737481	0	5217	189869	99	0
WJF	362827	0	3693	169892	7367	1
YIP	902471	7070	2366	219751	154	0
YKM	726351	0	28911	125189	8350	0

Table A8

COST AND AIR TRAFFIC ACTIVITY
ESTIMATES BY TRACON FOR 1992

LOCID	COSTTOT	NOTGATSO	GATSO
ABE	2788212	49561	161911
ABI	2122156	54043	135833
ABQ	3869400	159430	187344
ACK	1749698	62871	149415
ACT	1608587	23647	81833
ACY	3280518	34726	315797
ADW	3311018	106024	
AGS	2333261	31734	87207
ALB	3653883	114806	167432
ALO	1479484	36627	77344
AMA	2835789	55035	88954
ANC	4606922	212356	161377
ATL	10303356	732850	285796
AUS	5597376	138853	295032
AVL	1708391	29582	105288
AVP	1644553	38944	107103
AZO	2381262	40608	147541
BDL	6040662	148224	249885
BFL	1562662	38150	159509
BGM	2018267	45844	67996
BGR	1944089	60222	89649
BHM	3790001	72175	247833
BIL	2649711	35003	105460
BIS	1461557	26606	69257
BNA	3830239	99222	192248
BOI	2739327	81938	166239
BOS	7662557	413226	224791
BPT	1993678	53564	108773
BTR	2675808	44648	243171
BTV	2947754	88000	113818
BUF	3849204	107594	170949
BUR	5203854	80337	417657
BWI	6905395	296264	275037
CAE	3304537	59604	165305
CAK	2708492	48170	279918
CHA	2745469	31756	172357
CHS	3187216	96026	112462
CID	2776908	56791	138492
CKB	1565479	37525	121325
CLE	6357870	208068	210073
CLT	6919635	275485	255342
CMH	5895912	114870	358077
CMI	2501569	55917	182444
COS	2972720	90805	183700
CPR	1208764	23343	78182
CRP	3303278	103170	146628
CRW	2911772	42486	158416
CSG	2562877	67329	136030
CVG	4403802	164675	176877
CXY	2897101	23605	249517
DAB	3560640	37842	312958

Table A8 Continued

LOCID	COSTTOT	NOTGATSO	GATSO
DAL	2963484	133049	323521
DAY	5989613	172808	252586
DCA	7137017	394444	150792
DEN	8537531	504642	157888
DFW	9725287	898502	404486
DLH	1796357	30911	47797
DSM	3497135	68080	214182
DTW	7319062	434063	277682
ELM	1568847	24216	105553
ELP	3284924	81650	210089
ERI	1974732	41009	122904
EUG	1621512	31528	111881
EVV	2459488	56244	150400
EWR	7828826	361927	126871
FAI	2130523	59324	128236
FAR	1762529	29294	148260
FAT	2932583	55560	258114
FAY	2689113	77827	139567
FLL	2967252	149242	195424
FNT	2651500	41607	218796
FSD	1718317	41451	86975
FSM	1764972	36275	88136
FWA	2823237	44864	178881
GEG	2909885	100540	124687
GGG	1684240	15437	119639
GPT	2668412	64599	89060
GRB	2442249	51113	119190
GRR	2602953	51398	197807
GSO	3512576	76754	233126
GSP	2792033	46888	137369
GTF	1649365	28518	61060
HNL	6513582	311701	162761
HOU	1941248	151364	247258
HPN	1322955	42417	269697
HSV	2683135	45805	138151
HTS	1504689	26076	148496
HUF	1406940	28641	121346
HYA	2126938	108249	124411
IAD	4161383	177100	251076
IAH	7682365	472878	332300
ICT	3312718	71967	242785
ILM	2261632	42637	90771
IND	6097063	132394	269343
ISP	1361526	42828	279053
ITO	1521751	45832	32649
JAN	2997437	69385	104898
JAX	6326669	223105	180366
JFK	8121056	283657	174860
KWA			
LAN	2647101	47821	275412
LAS	6451274	219327	228541

Table A8 Continued

LOCID	COSTTOT	NOTGATSO	GATSO
LAX	10507461	551095	167019
LBB	5685477	198725	144418
LCH	2030953	50294	141164
LEX	2653809	40619	132251
LFT	2765491	36089	246093
LGA	7542065	355423	245453
LIT	3469094	78436	241838
LNK	2033775	48935	181781
MAF	2764196	43463	154183
MBS	2469706	36377	100880
MCI	6102127	255220	163541
MCN	2327414	57331	1[illegible]894
MCO	6109884	264932	328991
MDW	1545472	66525	137930
MEI	1972177	34960	46569
MEM	6943986	256867	194520
MFD	1488332	42178	120237
MGM	2462439	57558	120793
MIA	8468848	421400	321695
MKC	1076888	1[illegible]958	178739
MKE	5413753	133048	183846
MKG	1551592	35597	118005
MLI	2672494	63652	1[illegible]368
MLU	1758604	32569	1[illegible]139
MOB	2774904	76186	94911
MRY	1829031	33213	1[illegible]175
MSN	2532615	56601	180661
MSP	6675877	304747	[illegible]26488
MSY	6337049	175329	194.[illegible]70
OAK	5393144	102011	46[illegible]903
OGG	2064713	16[illegible]479	117019
OKC	6348690	1[illegible]3861	[illegible]41.8.
OLM	3638672	[illegible]2453	96109
OMA	3533202	87095	157[illegible]8
ONT	5797332	10[illegible]979	87513
ORD	13046145	875887	[illegible]6504.6
ORF	6326849	[illegible]39419	157[illegible]40
ORL	1149968	15[illegible]98	1910[illegible]3
PBI	5841194	1[illegible]3504	[illegible]60758
PDX	5218757	159017	166516
PHL	7405624	[illegible]68460	[illegible]7.[illegible]05
PHX	8397356	[illegible]81[illegible]55	[illegible]06[illegible]75
PIA	2836756	377[illegible]5	1[illegible]3931
PIT	7408253	361768	19914[illegible]
PMD	3983958	61784	43483
PNS	5867314	[illegible]98264	15[illegible]431
PSP	1921408	31441	12753[illegible]
PUB	1498155	38131	87961
PVD	3193838	42024	20[illegible]10[illegible]
PWM	3198414	70727	15[illegible]487
RDG	1447186	34[illegible]1	151750

Table A8 Continued

LOCID	COSTTOT	NOTGATSO	GATSO
RDU	3884637	106812	226954
RFD	2628131	40422	257093
RIC	3502683	124418	177014
RNO	2966324	61191	177013
ROA	2724649	46618	258799
ROC	3557247	61140	258417
RST	1431450	25200	98110
RSW	2686376	99075	154833
SAN	5526974	150323	68599
SAT	6796186	[illegible]	[illegible]
SAV	2711630	55713	153463
SBA	1510062	43024	255560
SBN	2664344	56609	210996
SCK	1734299	[illegible]	169468
SDF	4028195	107285	208887
SEA	5727158	263131	190555
SFO	3677825	325624	95641
SGF	1622963	33477	107163
SHV	2974458	78098	155505
SJC	[illegible]	[illegible]	[illegible]
SJU	[illegible]	[illegible]	[illegible]
SLC	[illegible]	[illegible]	[illegible]
SMF	[illegible]	[illegible]	[illegible]
SNA	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
STL	[illegible]	[illegible]	[illegible]
STT	[illegible]	[illegible]	[illegible]
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